

**REMARKS/ARGUMENTS**

Reconsideration of this application is requested. Claims 1-26 are in the case.

**I. INFORMATION DISCLOSURE STATEMENT**

Copies of the missing references identified by the Examiner are attached together with a completed PTO-1449. In addition, a copy of the Search Report which issued on PCT/GB00/02582, together with a copy of the references cited therein (which are not already of record) are also attached and listed in the PTO 1449. The requisite IDS fee is also included herewith.

The Examiner is requested to initial the attached PTO-1449 and to return a copy of the initialed document to the undersigned with the next paper to issue in this application.

**II. SPECIFICATION**

The specification has been amended to include customary headings, including a brief description of the drawings. No new matter is entered.

The specification at page 6 has been amended to include the meaning of the acronym "FID" (Free Induction Delay). Basis for this appears at page 16, line 5.

The specification has been amended at page 33, line 33 to recite "Figure 11" rather than "Figure 10". No new matter is entered.

Withdrawal of the objections to the specification is now believed to be in order. Such action is respectfully requested.

**III. CLAIM OBJECTIONS**

Claims 14 and 25 have been objected to in view of the language "for the or each such pair". In response, claims 14 and 25 have been amended to replace this passage with "for said at least one pair". Withdrawal of the claim objections is now respectfully requested.

**IV. THE OBVIOUSNESS REJECTION**

Claims 1-26 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over U.S. Patent 6,392,408 to Barrall et al and further in view of Schaewe et al. That rejection is respectfully traversed.

Claim 1 is directed to a method of analyzing a signal obtained by applying excitation to a sample and detecting a resonance response. The method comprises producing a model of the signal; and comparing the model to a predetermined model of a signal due to a phenomenon, thereby to determine whether the model represents a signal due to that phenomenon.

Barrall is generally concerned with pulse sequences. As the Examiner will appreciate, the generation of noise and interference-cancelling pulse sequences forms a considerable part of the research effort in this field. By contrast, the present invention is concerned with the processing of the detected signals. While Barrall makes reference to processing the signal, these references are brief and clearly based on prior art techniques such as threshold detection at a particular frequency after Fourier analysis. Barrall contains no disclosure or suggestion of what happens to the signal after combination of the oppositely-phased signals. In other words, the techniques

described purport to improve the SNR but disclose nothing pertinent to the decision as to whether the substance is present or not present.

According to Barrall, the response signals are “detected by the NQR detection system” (see column 10, line 55), “inputted to analog to digital converters” (see column 10, line 67) and “the digitized signals are processed by the digital signal processor” (see column 11, line 11). The disclosure about how this processing occurs is discussed at column 11, lines 28 to 46. This simply discloses subtraction of NQR B signals from NQR A signals to remove the noise. There is an assumption that the result is a “perfect” signal, so if there is no signal present, then there is no NQR substance present: “the cumulative NQR signal 19, will all be zero” [see column 11, lines 45,46].

The Examiner has identified a portion of Barrall at column 14, line 52 through column 15, line 10. This describes a transform to the frequency domain using a Fourier transform and comparing of signal characteristics. Absent any further information, this must be taken to relate to the thresholding at one or more frequency values, as discussed in the introduction to the present application. This is borne out by the portion of the Barrall patent from column 15 line 11 to line 24.

There is no disclosure in Barrall of anything other than a direct comparison between received signals and a threshold level in a frequency band. By contrast, the present invention makes a substance present/substance not present determination based on a comparison of models of the signals. This provides a significant improvement in the reliability of detection as illustrated by the experiments towards the end of the present specification.

The Examiner states that Barrall does not “expressly” teach producing a model of the response signal. As set out above, as far as signal processing is concerned, Barrall makes no contribution whatsoever over the prior art, and there is no implicit disclosure either. Moreover, there is no suggestion that the signal processing is in any way flawed or open to improvement.

The above-noted deficiencies of Barrall are not cured by Schaewe. There is no reason why one of ordinary skill would have contemplated combining these documents and it appears that the documents have been assembled on the basis of *ex post facto* analysis with knowledge of the present invention. First, the skilled person would have had no motivation to seek improvement in the signal processing techniques disclosed in Barrall. Secondly, were the skilled person to seek improvement of the signal processing, there is no apparent way that the skilled person would have been lead to Schaewe as it relates only to MRI rather than QR, and also to imaging and not detection. Even if the disclosure of Schaewe was combined with that of Barrall (it is believed this would not have occurred to one of ordinary skill), there is still no disclosure as to how the use of models would be added and how a present/not present determination would be made.

Based on the above, it is clear that the presently claimed invention is patentably distinguished over the combined disclosures of Barrall and Schaewe. One of ordinary skill would not have been motivated to arrive at the presently claimed invention based on the combined disclosures of those two references. Absent any such motivation, a *prima facie* case of obviousness has not been generated in this case. Reconsideration

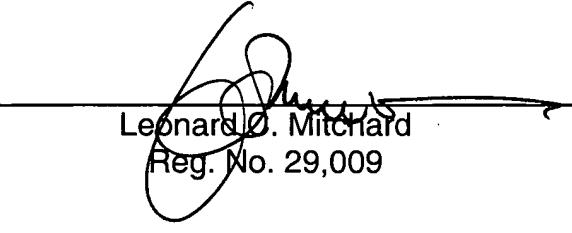
SMITH et al  
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and withdrawal of the outstanding obviousness rejection are accordingly respectfully requested.

Favorable action on this application is awaited.

Respectfully submitted,

**NIXON & VANDERHYE P.C.**

By: 

Leonard O. Mitchard  
Reg. No. 29,009

LCM:lfm  
901 North Glebe Road, 11th Floor  
Arlington, VA 22203-1808  
Telephone: (703) 816-4000  
Facsimile: (703) 816-4100  
Attachments: PCT Search Report; references; extension request; IDS fee.